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the principal confesses he cannot inaugurate the reform, then there is no hope; he is principal in name but is no leader. The correction of compositions, of course, requires patience; but patience is not a special virtue. Spelling and punctuation, paragraphing and penmanship, are, to be sure, wretchedly low, plebeian functions compared with the teaching of paradigms; but he who teaches in a high school must stoop even to these humiliations.

In the arrangement of our secondary schools as now organized, English written by pupils comes under the eye of every teacher; so that the opportunity for taking cognizance of English writing is presented to every teacher in more than sufficient abundance. The simple question is, Shall each teacher exercise supervision over the form of this writing, correcting and admonishing and insisting, just as he does with regard to the subject matter of his department. For English is a thing that everybody knows, and to ignore it is to be disloyal to duty.

Samuel Thurber

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FORMAL VS. CONCRETE STUDIES IN THE COLLEGE

The educated public is practically a unit in the opinion that the college should furnish a liberal education; in this demand there has been little change. But when we ask, What constitutes a liberal education? we find that the advanced thought of the present differs materially from the current ideas of forty years ago. Then the chief subjects were classics and mathematics; little else was taught.

Language is always the means by which we express thought, and mathematics the means by which we determine the quantitative relations of things. Evidently these are important subjects, for without language our thought would remain undeveloped, while without knowing how the quantity of one thing is related to that of others we should not be able to master the material world.

Railroads, bridges, ships, cities and the like, would be impossibilities. It is easy to see, therefore, that should we have nothing more in colleges than what is contained in Latin, Greek, and mathematics, we should still have much knowledge useful for life. So great, however, was the old estimation of the value of formal culture, that men were indifferent to the knowledge worth of studies. In accordance with this view, the classics were taught largely from the formal or grammatical standpoint. The ideas expressed by the Greek and Latin authors were not so much regarded as the grammatical construction of the language. To be sure, it is of immense service to bring pupils into contact with such ideas and views of life as are expressed by Plato; yet on the whole it must be admitted that the focus of the instruction was upon the grammatical construction of the language.

However inadequate this theory may now seem, there are still those who regard it as having so large a measure of truth, that it may be well to examine for a moment the favorable side of this formal discipline. In the first place, grammatical study appeals particularly to intellectual aspects of the mind, for it reveals in a somewhat concrete way its logical workings. All thought is of course expressed in language, and can thus be studied through linguistic forms. When the student devotes his time to the discovery of logical relations through a study of grammatical or rhetorical forms, he is in reality working at the beginnings of such subjects as logic, psychology, and philosophy. For this reason classical students are likely to be strong logical reasoners.

Furthermore, grammatical and mathematical studies are the easiest to teach. They become powerful pedagogical instruments of mind-training, even with poor teaching. The reason for this is that they are perfectly definite, and are for the most part logically arranged. This being the case, it is comparatively easy to present at each lesson just enough surmountable difficulties for the pupil to overcome. A lesson in Latin or Greek has so many sentences to translate, so many expressions to be noted. A lesson in mathematics has so many problems to solve. These difficulties are perceptible, definite, and surmountable. They are of a nature to make themselves felt to the student; he cannot help seeing them, and, if he learns his lesson, overcoming them. There is consequently in these subjects a movable fulcrum of

difficulties upon which the pupil may exert his mental power. This is the reason why linguistic and mathematical studies have always been such incomparable instruments for exercising the intellectual powers of students. It is still their warrant for a large place in the modern curriculum. The college has not yet learned how to teach modern subjects, even modern languages, in such a way as to make them equivalent to the old subjects as intellectual disciplines. There are difficulties, to be sure, in the dissection of a bird, but they do not force themselves upon the student, compelling him to master them in order to proceed. There is nothing that the professor of modern subjects needs to study so much as the pedagogy of his branch of instruction, for the probability is that a poorer teacher in the old studies will show better results in the line of strictly intellectual drill.

So much for the old curriculum under the old methods. We need now to see in what particulars the modern college has departed from the road our fathers trod. The departure has been a double one. Both methods and subject-matter have greatly changed.

Methods have become more concrete and inductive; less dogmatic, formal, and deductive. Instead of spending one or two years in detached grammatical study, before beginning to read a language, the teacher now sets the pupils to reading as soon as they have acquired even the most elementary notions of grammar. He calls attention to regularity of forms and structure, thus building up a knowledge of the grammar from the concrete matter of the text. The result is that the pupils read much earlier than they used to, gaining at the same time a much warmer interest in their study than was formerly possible. The same is, or may be, true in mathematics. This subject also is feeling the influence of the inductive sciences, which have taught us that it is better to proceed from facts to principles, than to attempt an application of principles before they are thoroughly understood.

But the point in which the present current idea of liberal education differs from the formal one just described, lies in the subject-matter. It might be inferred that the modern college curriculum differs from the old only in the number of subjects taught, when the question might at once be raised whether a few subjects well studied might not be better than a large number more super-

ficially taught. The difference is more than quantitative—it is one of kind. Not only were the old subjects taught in a formal manner, but they themselves were largely formal in character. Mathematics is not modern science, yet it underlies modern sciences as a form common to them all. We get a little of the concrete through the problems in arithmetic, algebra, and geometry, it is true, but pure mathematics is purely formal. In the same way, the grammar of any tongue is not thought, but it is a form in which all thought must be expressed. Now, if linguistics and mathematics may fairly be called formal in their nature, the one giving the form in which human thought must express itself, and the other giving the form governing the natural sciences, then it follows that these are largely form studies rather than thought or knowledge studies.

The position of the modern college is that it is perhaps more liberalizing and certainly far more useful to pursue thought studies along with form studies than it is to spend all the time on the formal aspect of instruction alone. The old idea that the student must, in order to get a liberal training, withdraw from lines of thought having immediate relation to life, reminds us of the monastic period when men withdrew to monasteries and hermits' caves in order to live a religious life, thus preparing themselves for the life to come. But just as we now perceive that religion is vital only as it is wrought out in daily life, so the modern college perceives that true liberality in education consists in training the student, not only through the forms of knowledge, but by means of the knowledge itself. Liberality of education consists not so much in possessing a traditional store of ideas, as in having understanding and sympathetic interest for what most concerns the welfare of man. He is illiberally educated whose interests and understanding are measured alone by what pertains solely to his calling.

The studies of which linguistics may be said to be the form are those that pertain to human life and social organizations, such as history, the record of what men have done; political economy, the examination of the production, exchange, and consumption of wealth; social science, a study of the social problems growing out of our religious, economic, and political conditions; political science, the systematic study of government; literature, the

artistic representation of the ideals and strivings of men. On the other hand, the concrete studies pertaining to nature are physics, chemistry, biology, geology, physical geography, etc. If, therefore, we grant the principle that it is as good for the mind to exercise itself on concrete knowledge as upon merely the abstract forms of knowledge, we see that the scope of college work immediately broadens. The old education fitted men for a few professions as they formally existed, such as law, medicine, and theology; but it had little immediate relation to other practical callings. It constituted in reality a special training for a few professions. Furthermore, it gave young men little opportunity to discover their natural tastes and abilities, whereas, the modern college, dealing with a number of lines of actual knowledge, furnishes this very desirable opportunity. The natural results of the old formal training are more apparent in Germany than in this new land, where pioneer conditions still exert an influence. There the cultured and the uncultured form distinct social castes. So powerful has this caste feeling been, that students have been known to commit suicide rather than engage in unprofessional work outside their caste. To this day the "bread studies," *i. e.* those having to do with real knowledge, are theoretically despised though they are in reality diligently pursued by students of the universities. Now, however, in this country, since the modern colleges recognize the dignity and culture value of all the great sciences of life and nature, they bring the advantages of higher education to entirely new classes of society. Instead of confining college education, as of old, to a few professions or to those who could afford it as a luxury, they now offer it as the greatest instrument of success in practical life for all who have the ability to pursue it and the money to pay for it. The college has, therefore, passed from a state largely aristocratic to one much more democratic.

Along with the admission of several domains of concrete knowledge, comes the necessary differentiation of study into several courses, or general lines of work. Nobody can learn everything. What we need to guard against is a one-sided culture. Each course of study should have a sufficient quantity of the various types of training essential to a fairly symmetrical development of mind. We need not concern ourselves so much with the question

whether a given course is in itself equal to another, as with the more important question whether it is best fitted to develop those phases of mind for which it is established.

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THE WASTE OF MATHEMATICS

There was a time, not many decades ago, when the culture of the colleges and the curricula of the schools consisted of Latin, Greek, and mathematics, in quantities varying with the thoroughness of the institution, but with quite a constant interdependent ratio. The heads of each of these departments watched one another most jealously to see that no one attempted to exceed his proper share of the student's time. While they were thus engaged in tripartite defence, other foes, foes from without, assumed the quiet aggressive and little by little the sciences found a place in the college course of study.

Latin was not at all averse to this inroad, because the nomenclature of science is largely taken from that tongue. Greek looked with forbearance upon the innovation for a like reason and shuddered only when hybrid words were called into use. Mathematics regarded the intrusion of the sciences with especial joy; they gave a strong reason for the extension of mathematical studies, and soon formed with them an inseparable alliance.

The time of the student, once divided by three, now came to have four for its divisor and as the sciences became differentiated a still further division became necessary. If the time was originally fully occupied what would be the effect of this increase of claimants? Either the ability to acquire information must be increased in like proportion or the demands of each subject must submit to a decrease. In one, at least, of the original three the converse of the second alternative has been observed. Mathematics has asserted that first of all it, as the great disciplinary study, cannot be subjected to curtailment and secondly, as the framework of proof in all the exact sciences, it must grow as they grow.